

REMARKS/ARGUMENTS

The Examiner is thanked for the careful review of the application as set out in the outstanding office action. Reconsideration of the application is respectfully requested.

Claims 1-2, 5-6, 10-11, 14-15, 22 stand rejected under 35 USC 103 as being unpatentable over Dunand in view of Petteruti et al. ("Petteruti"). This rejection is respectfully traversed on the ground that a prima facie case of obviousness has not been established, and the references do not teach or suggest the claimed invention.

Dunand describes a process for compensation of a defect in the advance of a print substrate by modifying the arrival position of ink droplets with a variable electrical charge on the substrate. Each band of droplets is printed with a mark on the margin or edge of the substrate, the substrate is advanced to print the next band, an algebraic difference is determined between a nominal theoretical position of the mark and the real position of the mark, a correction to the value of the charge voltage to be applied to each droplet to compensate for the position error is determined, and the substrate correction is applied to each droplet in the next band, in addition to the nominal voltage. (Abstract) Thus, the printing of the mark is performed during printing of normal print jobs.

Claim 1 recites entering a diagnostic mode of the printing system in which mode normal printing jobs of the printing system are not printed. Dunand clearly does not disclose entering such a diagnostic mode. This is undisputed.

The Examiner cites Petteruti as disclosing a process in a printer comprising a step of entering a diagnostic mode of the printing system in which normal printing jobs are not printed (FIG. 8b; step PERFORM DIAGNOSTICS TEST). The Examiner further states that Petteruti discloses

an initial step of checking for printhead health and taking any corrective needed action prior to printing said diagnostic pattern, citing "FIG. 8b; programs related to the operation of the printhead is run for testing." Applicants disagree with this recitation of the teachings of Petteruti.

Petteruti describes a thermal printer employing a thermal print mechanism, which may use a thermal transfer ribbon or thermal paper. The reference is not directed to an ink-jet printing system. The diagnostic mode of FIG. 8B is described only as a "diagnostic mode during initialization in which a series of diagnostic tests are performed and a report printed." (9:33-35). There is no description of an initial step for checking for printhead health and taking any correction needed action. In fact, Petteruti does not describe an inkjet printhead, and so there is clearly no need for such a step in Petteruti.

The Examiner states that it would have been obvious to modify "the diagnostic method disclosed by Dunand such that the diagnostic mode of the printing system is entered in which mode normal printing jobs of the printing system are not printed, and the printhead health is checked prior to printing said pattern as disclosed by Petteruti. The motivation of doing so is to ensure the printer operating as designed before printing jobs are done." Applicants respectfully disagree.

The Federal Circuit stated the law of obviousness in In re Kotzab, 55 USPQ 2d 1313, 1316-1317 (Fed.Cir. 2000):

"A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field... Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one 'to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher,'... [citations omitted]

Most if not all inventions arise from a combination of old elements... Thus, every element of a claimed invention may often be found in the prior art... However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention... Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant... Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference...." [citations omitted]

Here, there has been no showing of a suggestion or motivation to modify Dunand to arrive at the claimed invention. Petteruti is cited as supplying teachings admittedly missing from Dunand, yet Petteruti simply does not teach or suggest these missing teachings, as explained above. Moreover, there is no teaching or suggestion from the applied references to modify Dunand with a diagnostic mode as in Claim 1. Dunand teaches measuring the position of a mark printed during each swath of a print job, and correcting a voltage applied to drops during printing of the next swath.

Similar considerations apply to Claims 6, 10, 15 and 22.

The dependent claims add further distinguishing features. Claims 2 and 11 recite conducting a plurality of media advances, so that media advance errors resulting from the plurality of media advance errors are accumulated between printing the first area and the further area. FIG. 8 of Dunand does not disclose this feature, but instead describes printing a mark on each pass of the printheads.

Because a prima facie case of obviousness has not been established, the rejection of Claims 1-2, 5-6, 10-11, 14-15 and 22 should be withdrawn.

Claims 7 and 16 stand rejected under 35 USC 103 as being unpatentable over Dunand in view of Petteruti and Maeda. This ground of rejection is respectfully traversed, for reasons discussed above regarding Claims 1 and 10. A prima facie case of obviousness has not been established.

The Examiner agrees that Dunand and Petteruti do not disclose the features of dependent Claims 7 and 16. Maeda is cited as allegedly showing printing different areas of a diagnostic plot. Applicants respectfully disagree with the recitation of the alleged teachings of Maeda. The embodiment illustrated in FIGS. 7-10 of Maeda is directed to the problem of an ink drawing phenomenon causing bleeding, resulting from laying down a dot right next to a just previously deposited dot. By depositing respective dots in a checkerboard fashion, the ink drawing phenomenon is said to be avoided. FIGS. 10A-10D show the technique of checkerboard printing using respective mask patterns. See, Maeda at 10:35 to 11:54.

The passages of Maeda cited by the Examiner do not pertain to a "diagnostic plot," or a "diagnostic multi-pass print mode mask," but rather to techniques of printing to avoid bleed during normal print operations.

Because Dunand and Petteruti admittedly do not show the features of Claims 7 and 16, and because Maeda does not supply the missing teachings of these claims, a prima facie case of obviousness has not been established.

Claims 3, 8-9, 12, 17-18 and 20-21 stand rejected under 35 USC 103 as being unpatentable over Dunand in view of Yen et al. ("Yen"). This rejection is respectfully traversed on the ground that a prima facie case of obviousness has not been established, and the applied references do not teach or suggest the claimed invention.

Dunand has been discussed above, and does not teach or suggest the features of these claims, for reasons similar to those discussed above. Applicants respectfully deny the Examiner's allegations regarding the teachings of Dunand regarding Claims 3, 8-9, 12, 17-18 and 20-21.

Yen is cited as allegedly disclosing "printing patterns including the first $w/2$ pixels in the row are printed in the same pass, and the last $w/2$ pixels in the row are printed in another pass, wherein said diagnostic print mode mask includes a row wherein said first $w/2$ pixels are printed in a first pass, and said last $w/2$ pixels are printed in a last pass of said plurality of passes (FIG. 6), and wherein said different areas are nominally aligned along a horizontal line (FIG. 3)." Applicants respectfully deny that Yen discloses the foregoing teachings.

The Examiner holds that it would have been obvious to "modify the diagnostic print pattern disclosed by Dunand such as the first $w/2$ pixels are printed in a first pass and the last $w/2$ pixels are printed in a last pass of said plurality of passes as disclosed by Yen et al. The motivation of doing so is to eliminate unpleasant banding artifacts caused by ink migration as taught by Yen et al. (Abstract)." Applicants respectfully traverse this holding.

Yen discloses a mask pattern having 4 by 4 triangular tiling clusters, as shown in FIG. 6, which provide a balance between reduction of banding artifacts and increase in image granularity. The mask pattern is not described as a diagnostic print mask, nor does Yen describe printing a diagnostic pattern as recited in Claim 3. The Examiner refers to FIG. 3 as allegedly disclosing "said different areas are nominally aligned along a horizontal line," yet FIG. 3 is said to be a printed image produced by an inkjet printer, effectively 60x magnified to show a banding phenomenon. (1: 61-65) It is not seen how this figure supports the Examiner's contentions.

Similar considerations apply to Claims 8, 17, 18, 20 and 21, which have been amended to clarify that the diagnostic print mode mask comprising a rectilinear grid of pixels and a row width of w pixels.

The rejection under Section 103 should be withdrawn on the grounds that a prima facie case of obviousness has not been established.

Claims 4 and 13 stand rejected as being unpatentable over Dunand in view of Otsuki et al. ("Otsuki"). This ground of rejection is respectfully traversed, on the grounds that a prima facie case of obviousness has not been established, and the applied references do not teach or suggest the claimed invention.

The Examiner alleges that Dunand discloses the claimed invention, except where the "step of examining the diagnostic pattern is conducted visually by a user." Otsuki is cited as allegedly disclosing a process in a printer including a step of examining the diagnostic pattern visually by a user. The Examiner holds that it would have been obvious to modify the examining process of the diagnostic pattern of Dunand such that the diagnostic pattern is conducted visually by a user as disclosed by Otsuki, and that the motivation of doing so is to correct the advance media error by inputting correction values or adjusting parameters of the system which are done by the user as taught by Otsuki. Applicants respectfully traverse this holding.

Dunand has been discussed above. The reference describes printing a mark on each swath during normal printing, and measuring the position of that mark against its nominal position. One of ordinary skill would not replace the optical sensor system of Dunand with a manual system of user examination, for several reasons. One is that a user would be extremely unlikely to be able to visually measure the position of a mark against some nominal position. A second reason is that printing speed would be slowed to a virtual crawl, since a measurement is made on each swath. Essentially, the modification suggested by the Examiner would render the printer of Dunand inoperative for its intended purpose.

As for Claim 13, Dunand does not disclose all features of this claim except for user examination of a diagnostic pattern, including for example "entering a diagnostic multi-pass print mode" and "printing different passes of a diagnostic plot at different passes...". Thus, Claim 13 is further distinguished from the Examiner's combination of references.

CONCLUSION

The outstanding rejections should be withdrawn. A prima facie case of obviousness has not been established. The applied references alone or in combination do not teach or suggest the claimed invention. Applicants respectfully submit that the application should be allowed.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Larry K. Roberts". The signature is fluid and cursive, with the first name "Larry" and last name "Roberts" clearly distinguishable.

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Dated: 9/30/03

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